Morphology and sedimentary filling of an ancient estuarine valley in an urban environment (Gijón, NW Spain)

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The city of Gijón is located on the Cantabrian Coast (NW, Spain), and its subsurface is formed mainly by sand linked to an old estuarine mouth barrier (beach and dunes), sand bay and marshes. Under these sediments, there is a layer of clays related to the weathering of a Jurassic rock basement. This research addresses the setting of the estuary sediments in both the submerged area, located north of the city, and under the built-up area.

The seafloor morphology was investigated by means of a bathymetric survey with multi-beam echo sounder. A geophysical survey using high-resolution reflection seismic profiles allowed studying the thickness of the unconsolidated deposits that fill the bay of Gijón. Likewise, the distribution of coastal sediments under the city was reviewed from boreholes collected within a GIS-based geotechnical database.

The bathymetric reconstruction led to the identification of a paleo-valley supposedly excavated by the main river of the city, with N-S orientation that evolves to NNE-SSW towards the north. It shows a sandy bottom with a very low slope, a length of about 4 km and a width that ranges between 400 and 800 m. In this channel, the unconsolidated deposits reach a maximum thickness of around 15 m while at S, in the urban subsurface, the thickness exceeds 20 m locally. With these data, it was also possible to investigate the geometry of the bedrock under the sedimentary filling.